



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

AP

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/634,220	08/05/2003	Olga Kryliouk	5853-413	6501
30448	7590	06/29/2004		EXAMINER
AKERMAN SENTERFITT				LE, THAO P
P.O. BOX 3188				
WEST PALM BEACH, FL 33402-3188			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 06/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	10/634,220	KRYLIOUK ET AL.
	Examiner	Art Unit
	Thao P. Le	2818

-- The MAILING DATE of this communication app ars on the cover she t with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 25 May 2004.  
 2a) This action is FINAL.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-15 is/are pending in the application.  
 4a) Of the above claim(s) 7-15 is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-6 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 8/5/03 is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>01/20/04, 04/01/04</u> .	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
	6) <input type="checkbox"/> Other: _____

## DETAILED ACTION

### ***Election/Restriction***

1. Examiner confirms that Applicants elected to prosecute Claims 1-6 and have withdrawn Claims 7-15 without prejudice.

### ***Information Disclosure Statement***

2. Information Disclosure Statements (IDS) filed on **01/20/04 and 04/01/04** are made of record. The references cited on the PTOL 1449 forms have been considered.

### **Claim Rejections**

#### **Claim Rejections - 35 USC § 103**

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nikishin et al. (IDS submitted by applicant) and in view of Ek et al., U.S. Patent No. 5,563,428.

Regarding to claim 1, Nikishin et al. discloses an article comprising (See pages 2073-2074 and Fig.1):

- . a cyrstal silicon substrate Si(111);
- . a buffer layer AlN disposed on substrate;
- . a single crystal group III-nitride layer (GaN) disposed on the layer AlN.

Nikishin et al. discloses the layer disclosed on the substrate is made of AlN but fails to disclose the layer is made of silicon oxynitride. Ek et al. discloses the article comprising the Si substrate 1 and the silicon oxynitride layer 2 disposed on the substrate (lines 2-3, Col. 3). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use silicon oxynitride layer instead of AlN as disclosed in Ek et al. because silicon oxynitride layer formed on the crystal silicon substrate would reduce the difference in lattice parameters, reduce the strength of the Si-N bond beween silicon of SiNO layer and nitrogen of GaN layer, improve thermal stability, low stress, and crack resistance in order to enhance a high quality GaN.

Regarding to claim 2, Nikishin et al. discloses the article of claim 1 wherein the silicon substrate is 111 oriented (page 2073).

Regarding to claim 3, Nikishin et al. discloses the article of claim 1 wherein the single crystal group III-nitride layer is selected from the group consisting of GaN (page 2073).

Regarding to claims 5-6, it is inherent that the articles of Nikishin et al. and Ek et al. further comprising an integrated electronic circuit of optical or optoelectronic device build on the article (see Fig. 3 of Ek,

Regarding to claim 4, Ek et al. fails to disclose the thickness of the silicon oxynitride layer is from 15-40 angstroms. However, it is obvious to one having skill in the art at the time the invention was made to form the SiNO layer with a proper thickness which can carry out its function and also reduce the device area. In addition, the selection of these parameters such as **energy, concentration, temperature, time, molar fraction, depth, thickness, etc.**, would have been obvious and involve routine optimization which has been held to be within the level of ordinary skill in the art. "Normally, it is to be expected that a change in **energy, concentration, temperature, time, molar fraction, depth, thickness, etc., or in combination of the parameters** would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller* 105 USPQ233, 255 (CCPA 1955). See also *In re Waite* 77 USPQ 586 (CCPA 1948); *In re Scherl* 70 USPQ 204 (CCPA 1946); *In re Irmscher* 66 USPQ 314 (CCPA 1945); *In re Norman* 66 USPQ 308 (CCPA 1945); *In re Swenson* 56 USPQ 372 (CCPA 1942); *In re Sola* 25 USPQ 433 (CCPA 1935); *In re Dreyfus* 24 USPQ 52 (CCPA 1934).

5. A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao P. Le whose telephone number is 571-272-1785. The examiner can normally be reached on M-T (7-6).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Thao P. Le  
Examiner

June 22, 2004